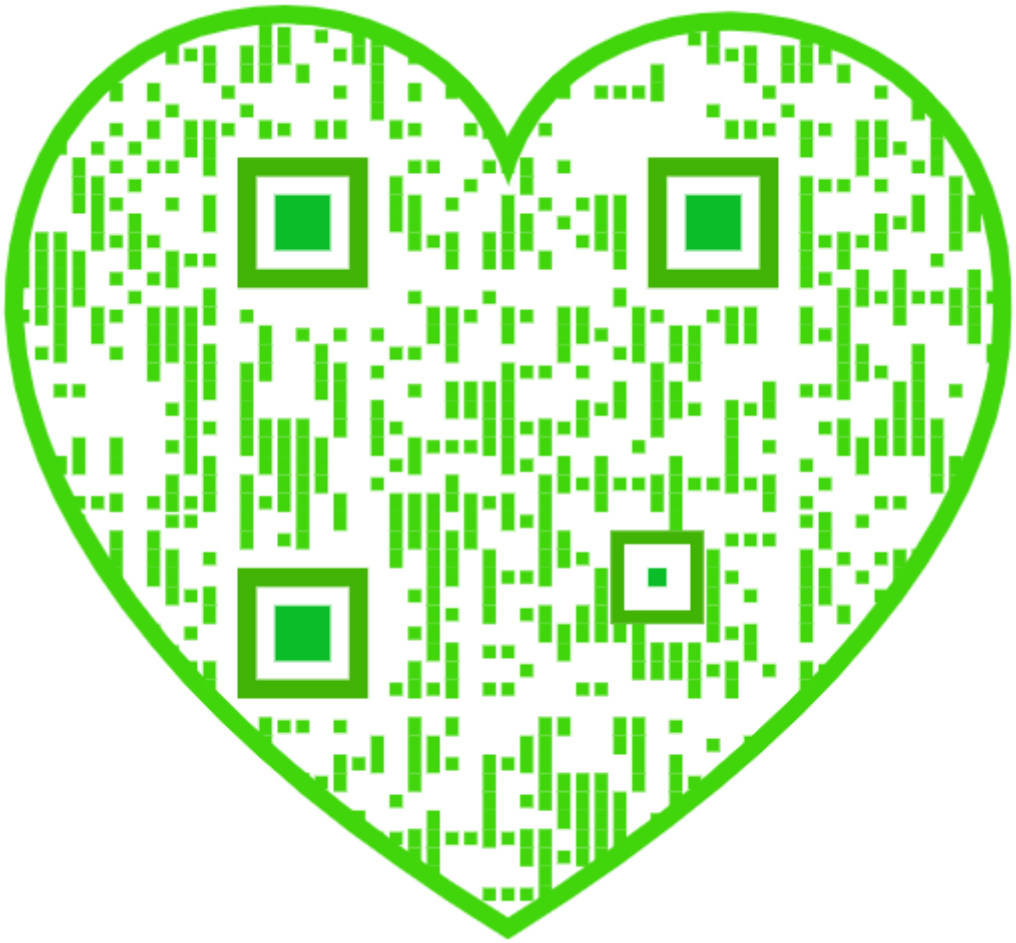
Copy 1



0 000 879 754 7

SD 143
.P9
Copy 1

Practical Forestry in the Southern Appalachians.

BY

OVERTON W. PRICE,

Superintendent of Working Plans—Division of Forestry.

[Reprint from Yearbook of Department of Agriculture for 1900.]

THE LIBRARY
OF CONGRESS

CONTENTS.

	Page.
Introduction	357
General description of the region	357
The forest	358
Forest types	359
Lumbering	360
The local system	362
Damage to the forest	362
Fire	363
Causes of fires	363
Damage by fires	364
Suggestions for management	365
Cut-over lands	365
Virgin forests	366
Need of practical forestry	368

ILLUSTRATIONS.

PLATE XXXVIII.	Dogwood in flower	358
XXXIX.	Yellow Poplar and Hemlock on north slope	358
XL.	A characteristic mountain stream	362
XLI.	A mountain road	362
XLII.	A deadening	362
XLIII.	The Chestnut	368

PRACTICAL FORESTRY IN THE SOUTHERN APPALACHIANS.

By Overton W. Price,
Superintendent of Working Plans, Division of Forestry.

INTRODUCTION.

The Southern Appalachians offer an excellent field for practical forestry. The need of systematic and conservative forest management is beginning to be keenly felt, both for the timber tract and the wood lot. The present desultory form of lumbering, which dates from the settlement of the region, has resulted in a serious reduction of the existing supply of timber. The unnecessary damage which has accompanied this lumbering, together with the repeated fires and excessive grazing to which the forest has been largely subjected, has greatly retarded the production of a second crop. Although there is still enough wood to fill the wants of the settlers, the cost of obtaining it is constantly increasing with the growing distance between the supply and the market. Around the towns and villages the belt of woodlands from which all merchantable timber has been culled widens every year, while fire and grazing often prevent young trees from springing up on the cut-over area.

The rapid increase now going on in the values of timber and in the cost of firewood is premature in so densely forested a country, and is the direct result of wasteful methods in the utilization of its resources. A continuance of these methods will necessarily result in a serious check to the general prosperity of western North Carolina and eastern Tennessee, where the inhabitants have already to contend with the remoteness and ruggedness of the region, and with an exceedingly low percentage of arable land. These methods will, moreover, not only render it costly to obtain wood for home consumption, but will entirely destroy what is still the most important source of revenue in the Southern Appalachians—the lumbering of its valuable hardwoods to supply a steady and increasing demand in distant markets.

It is intended in this paper merely to outline the nature of the problem at hand and to suggest certain general lines of treatment that might be followed.

GENERAL DESCRIPTION OF THE REGION.

The mountain region of western North Carolina and eastern Tennessee comprises an area of 15,000 square miles. It includes the Blue

Ridge on the east and the Smoky Mountains on the west, with the high and broken plateau which lies between them. Many spurs and ridges run off at right angles from these two ranges upon the plateau, and make of it the loftiest and most rugged section east of the Rocky Mountains. The more important of these cross chains are the Black Mountains, a spur of the Blue Ridge, which contain Mitchell Peak, 6,711 feet high; the Balsam Mountains, with a mean elevation of over 5,000 feet; and the Cowee Mountains, one of the longest of the cross ranges. Beginning on the east with the spurs of the Blue Ridge, which lose themselves in the Piedmont district, the elevation increases and the character of the mountain region grows more rugged westward toward the Smokies, in which the Appalachian system culminates.

The slates, granite, and gneiss, with their intermediate forms, are the chief underlying rocks. Of these, the gneiss is most common. It is usually soft, and disintegrates rapidly, forming a sandy loam which, although not particularly rich, is loose, fresh, and of great depth, except where the grade is such as to cause excessive erosion.

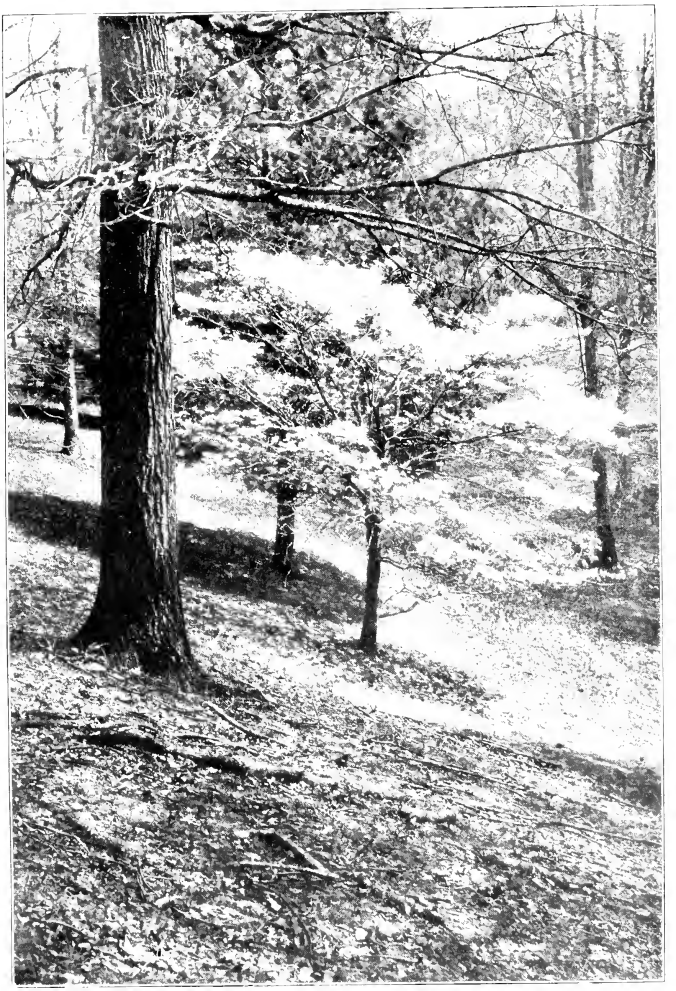
Where gneiss is the surface formation the slopes are generally smooth and rounded as a result of its rapid weathering. Where the slowly disintegrating granite forms the outcrop the topography is rugged and the slopes steep and bowlder-strewn, and sometimes craggy and precipitous, particularly those which face toward the south.

With the exception of the natural meadows which occupy the summits of some of the higher peaks, the mountains are covered with forest growth. The valleys are almost entirely under cultivation. Upland farming is carried on upon the foothills, and occasionally, for lack of better ground, upon mountain slopes so steep that their thorough cultivation is impossible.

THE FOREST.

It has often been said that it is in this region that the forest trees of the North mingle with those of the South, and the statement gives but an incomplete idea of the great variety of trees which is here the result of wide local differences in soil and climate. Western North Carolina and eastern Tennessee contain over one hundred kinds of native trees. Of these, some, such as the Black Spruce and Balsam, which find in the Smokies at an elevation of 4,000 feet and over conditions similar to those of their northern habitat, are either too rare or too difficult of access to be often of commercial importance. Others, such as the Black Gum, Sourwood, Dogwood, Buckeye, and Aspen, are valueless for timber, and are used for firewood only when no better kinds are to be had. (Pl. XXXVIII.) Others again, among which are the Striped Maple, the Haw, and the Silverbell Tree, have as yet no merchantable value.

Among the commercial trees the more important hardwoods are the Yellow Poplar, the Oaks, Hickories, Chestnut, Birch, Ash, Cherry,



DOGWOOD IN FLOWER.

YELLOW POPLAR AND HEMLOCK ON NORTH SLOPE.

[Photograph by H. B. Ayres.]

Basswood, Black Walnut, and Maple. The merchantable softwoods, of which there are comparatively few, are chiefly Shortleaf Pine, White Pine, and Hemlock. They seldom predominate in the mixture, but occur by groups and single trees, the Shortleaf Pine in the larger valleys and on the foothills, the White Pine confined chiefly to coves and intermediate low ridges in the Blue Ridge, and the Hemlock along the streams and on the lower slopes of the mountain valleys. The latter, although much less common than farther north in the mountains of Virginia and West Virginia, on account of the increased number of faster-growing trees with which it has to contend, probably reaches in this region a larger size than anywhere else within its habitat.

FOREST TYPES.

The many kinds of trees native to this portion of the Southern Appalachians, and the fact that most of them have a wide local range, renders the forest exceedingly varied and makes it difficult to classify it into types except in a very broad and general way. The Oaks, among which the White Oak is most frequent, form the chief part of the forest growth up to an elevation of about 2,500 feet. With them are mixed the Shortleaf Pine, the Hickories, and a host of subordinate kinds, among which the Black Gum and Red Maple are most common in moist situations, the Basswood, Birches, Ashes, Yellow Poplar, and Cucumber Tree on fresh soils, and the Chestnut, Locust, Dogwood, and Sourwood on south slopes and in dry localities generally.

At an elevation of 2,500 to 3,500 feet the number of the Oaks decreases and Yellow Poplar, Hemlock, Birch, Beech, Ash, Black Walnut, and Cherry reach their best development and predominate especially in coves and hollows with a northerly aspect. (Pl. XXXIX.)

Above 3,500 feet the forest falls off both in the number of different kinds of trees and in their size and quality. The Chestnut, Chestnut Oak, and Red Oak are the characteristic trees of this belt and occur almost pure on dry, steep slopes and ridges. Finally, at about 4,000 feet, dense woods of Black Spruce and Balsam Fir cover the ground to the exclusion of all other trees and reach to the mountain tops, except on the "balds," the local term for those mountains, the crests of which are occupied by natural meadows.

The general type of these forests, except where modified by lumbering or fire, or by both, is that of the virgin forest, exceedingly irregular in age and density. On the lower slopes, where the Oak prevails and where logging for timber and firewood has long been carried on, and which also have suffered from excessive grazing and repeated fires, the forest consists largely of second growth, seldom over forty years old. Above this second growth, in which a constant struggle goes on between the Oaks and the Shortleaf Pine, the latter holding its own almost everywhere and having the upper hand on the

poor soils, stand mostly old oak and pine, which generally owe their presence to the fact that they are unfit for lumber. The result is a very irregular two-storied forest, the old oak and pine forming the upper story and the second growth the lower, the latter varying greatly in age in different localities, according to the dates of the lumbering, and often in the same locality, where there have been repeated cuttings, each one of which has induced a new growth of seedlings and stump shoots.

Higher up in the mountains, where there has been less fire and lumbering, is perhaps the most perfect form of the mixed virgin forest to be found in this country. Trees of all ages occur together, and there is seldom, except where a space has been laid bare by wind and seeded up, any approach to an even-aged growth. It is here that the struggle for existence has been carried on without intervention and that trees of each kind have held their own in the mixture through the characteristics which have been given them for that purpose—one by plentiful crops of seed, another by capacity to endure great shade, another by its rapid growth or its adaptability to many different soils and situations. The result has been a forest containing a wonderful variety of types and forms of mixture. Some of the trees, particularly the Yellow Poplar and Hemlock, show a marked tendency to distribution by groups and patches. The Ash, Basswood, Beech, and most of the others, however, are distributed evenly throughout those localities which are favorable to them.

This region shows a variety in the undergrowth which corresponds to the richness of its silva. Among the most characteristic shrubs and those which influence chiefly the reproduction of the forest are the Rhododendron and Kalmia, or Mountain Laurel, which in the higher mountains not infrequently form a distinct and almost impenetrable second story under the forest trees. After these the more important of the shrubs and shrub-like trees are the Serviceberry, Sumach, Magnolia, Holly, Sassafras, Haw, Stagbush, and Hazel.

LUMBERING.

There are two distinct types of lumbering in the Southern Appalachians, similar in the extent of the harm done to the forest, but differing widely in the manner in which they are carried out.

The one is the slipshod, desultory form which has been practiced by the farmers of this region since its settlement in order to eke out the generally scanty profits from their farms. Although their output is small individually, their combined efforts, extending over many years, have resulted in the culling of the best timber over a large portion of the more accessible forests. The scattered distribution of the merchantable trees, however, has rendered the lumbering comparatively light except where firewood has been cut as well as saw logs.

The other dates from the time when, some fifteen years ago, with the failing supply of timber in Maine, Michigan, and the north woods generally, began the exodus of many Northern lumbermen to the hardwood forests of the Virginias, Georgia, and Tennessee, and to the pineries and cypress swamps in the far South. With their arrival began lumbering on a large scale in the Southern Appalachians, together with the investment of commensurate capital in logging outfits, the thorough repair and extension of logging roads, and the application of those skillful and businesslike methods which constitute clean lumbering. The active and systematic manner in which these men conducted a lumber job and the margin of profit which they wrung from it were a revelation to the natives, but have not yet resulted in any appreciable improvement in their methods.

It is nevertheless to be remembered that several factors have tended to make a poor lumberman of the farmer of western North Carolina or eastern Tennessee. He is often hampered by lack of the capital necessary to make the most of lumbering in this region, and he is generally wanting in the knowledge requisite to the best use of it. He has had always to contend with the difficulty of obtaining expert loggers to carry out the work, and is generally obliged, through the scarcity of available white men, to employ negroes, who seldom do well in the lumber woods, for the reason that they are usually strongly averse to the mode of life required of them. Nevertheless, the nearness of large bodies of merchantable timber, among which are valuable kinds, such as the Cherry, Black Walnut, Hickory, and Yellow Poplar, has usually made a fair profit possible under even the most thriftless logging methods.

The unnecessary damage to the forest and the total lack of provision for a future crop, characteristic of lumbering generally in the Southern Appalachians, is deplorable. It is a form of waste, however, which can not be eliminated by criticism, but can best be checked by proof of the advantages of more conservative methods, through their application to a portion of these forests, either by the Government upon its own lands or in cooperation with private owners.

There is, however, much immediate loss incurred by a species of slovenliness which is as foreign to clean lumbering as it is to practical forestry, and is entirely without excuse. Entire trees found to be unsound at the base are often left upon the ground to rot, rather than butt off the decayed portion. Not infrequently sound trees of a merchantable diameter are carelessly left uncut upon the lumbered area. There is great waste in high stumps and in lack of judgment in sawing up the trees, while careless felling leaves many a lodged tree in the woods or smashes the more brittle kinds, particularly the Yellow Poplar.

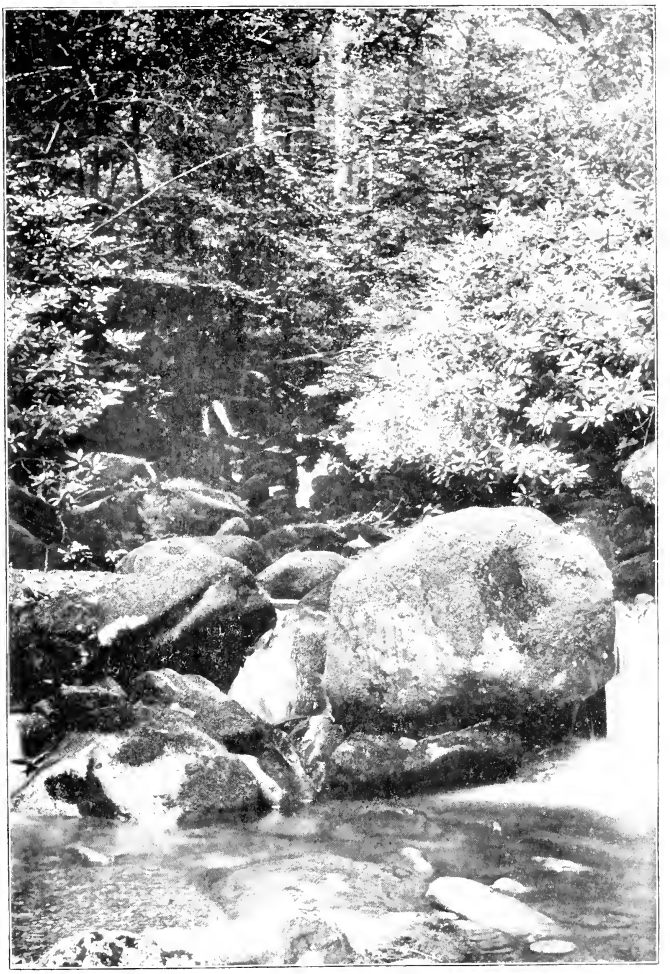
THE LOCAL SYSTEM.

The local system of lumbering is exceedingly simple. The trees are felled and sawn into logs where they lie, and these are snaked, or skidded, by horses, or, more often, by cattle, to the roadside or the river bank. Logging streams are rare, however, in the Southern Appalachians, and the customary way of getting the logs to the mill or to the railroad is by wagon over the rough mountain roads. (Pls. XL and XLI.) It is a somewhat primitive system throughout, but it is the one most generally suited to the nature of the country and to the distribution of the merchantable timber, which does not often favor the employment of those labor-saving devices which have been found profitable in logging elsewhere. The lack of sufficient snow usually prevents the use of sleds instead of logging wagons. The topography is often better adapted to timber slides or to donkey engines and wire cables for bringing the logs to the roads than to snaking with teams. The merchantable timber, however, is generally so scattered that the amount which could be transported by one slide or from one spot by an engine and cable is seldom sufficient to render them profitable. These and similar appliances suitable to a rough mountain country, but to the success of which a dense merchantable stand, or, in other words, a large amount of timber upon a small area, is necessary, have here usually been found impracticable.

DAMAGE TO THE FOREST.

The harm done to the forest is very great in proportion to the quantity of timber cut. This is due largely to the size of the trees and to the fact that little care is taken in the fellings. The damage to young growth is aggravated by the absence of snow and by the fact that the fellings are not infrequently made when the trees are in full leaf.

The breaking down and wounding of seedlings and young trees by the snaking of the logs to the roadside or the river is in large part unavoidable. There are often, however, many more snakeways, or skidways, than are necessary, and the application of a little system in laying them out would save time and young growth on a lumber job. On the higher and steeper slopes it is often the habit, and one which can not be criticised too strongly, except in those rare cases where it is absolutely necessary on account of the gradient, to roll the logs from top to bottom, merely starting them with the cant hook. A 16-foot log, 3 feet or more in diameter, can gain momentum enough in this way to smash even fair-sized trees in its path, and should it pass through dense young growth it leaves a track like that of a miniature tornado. The practice is in line with others to be observed in the Southern Appalachians, such as the common habit, for example, of leaving to rot the "deadened" trees which stand over clearings.



A CHARACTERISTIC MOUNTAIN STREAM.

[Photograph by H. B. Ayres.]

A MOUNTAIN ROAD.

[Photograph by H. B. Ayres.]

A DEADENING.

There are cases in which these clearings have been inclosed with fences built of rails split from prime Black Walnut, with no other excuse than that the walnut happened to be within easier reach than either Oak or Pine. (Pl. XLII.)

Under such methods, in which there is not only an absolute lack of provision for a future crop, but often a marked absence of that forethought, skill, and aversion to waste which go to make clean lumbering, most of the logged-over areas in the Southern Appalachians are only saved from entire destruction of the standing trees by the generally scattered distribution of the merchantable timber.

FIRE.

Fire has done, and continues to do, enormous damage in the Southern Appalachians. This has been the result not only of local conditions, which are exceedingly favorable to fires, but of a very passive sentiment in regard to them. In most great forest regions, with increase in population has grown a more determined attitude toward forest fires and a consequent falling off in the frequency of their occurrence. This has not yet been the case in the Southern Appalachians. The area burned over annually has increased rather than diminished, and the general feeling among the natives is one of somewhat placid resignation to an evil which is not fully realized and which is considered almost inevitable. Inevitable it assuredly is not; but there are several factors which combine to render fires in this region exceedingly difficult to check when once they are started. The absence of snow except for short periods, or of a marked rainy season, makes the danger a generally constant one throughout the time when the trees are leafless. There are seldom in the higher mountains any clearings or natural openings to serve as fire breaks, and the forests contain a large amount of dead timber, which adds power to the fires.

CAUSES OF FIRES.

There is not enough game in the Southern Appalachians to encourage camping during the autumn and winter months, and very few of the forest fires can be laid to campers. The number set maliciously is also small. Some are undoubtedly started each year by carelessness in the lumber camps, from the burning of tops and branches in the recent clearings, or by tourists and cattlemen. By far the larger number, however, are the result of the long-established practice of burning over the woods in the autumn under the belief that better pasturage is thus obtained the following year. These fires are set by the farmers in the area upon which they expect to turn out their sheep and cattle during the next season, and there is rarely an attempt made to confine them unless a neighbor's house or barn should be endangered. The consequence is that, except when isolated by roads or clearings, they

often spread from the wood lots of the valleys and foothills in which they are set out to the forests of the higher mountains, where they burn unmolested for days or even weeks, until finally extinguished by rain, snow, contrary wind, or lack of inflammable material in the sparse forests of the stony upper slopes. These fires are set year after year upon the same areas. They decrease annually in heat and power on the areas already burned over, until finally, with almost every vestige of the humus destroyed and the mineral soil baked and hardened, there is but little left upon the ground to burn except the leaf-fall of the preceding season.

It would seem that so common and ancient a practice as the burning over of forest land in the Southern Appalachians in order to improve the pasturage would long since have been abandoned had it not proved successful. However, apart from the damage caused to the forest, doubt has already arisen among some of the farmers themselves as to whether it is not, after all, a short-sighted policy. The result of burning over forest land the first time in this region is undeniably to destroy shrubs and seedlings and to stimulate the growth of weeds and grasses which afford good grazing. On the other hand, there are many localities which owe their unfitness for grazing to repeated fires. The final result is a sparse, unhealthy forest, entirely insufficient to protect from sun and wind the hardened and impoverished soil beneath it, which is generally covered with a straggling growth of broom sedge or wire grass, and is practically bare of other herbage. On slopes, where the admission of light and the destruction of the vegetable mold has been followed by more or less excessive erosion, the mineral soil is sometimes exposed, or even worn down to the underlying rock, where it is near the surface.

The whole matter awaits thorough and systematic study before it can be authoritatively stated whether, disregarding the damage to the timber and with a view to grazing only, it is best to exclude fire entirely from forest land in this region or under what conditions and restrictions to make use of it. The local grazing interests are important, and the annual fires will continue until it has been established to the satisfaction of the natives that they fail of their prime object in the long run. A detailed investigation on the ground of this matter by unprejudiced men, with the publication of its results, will be the first and most important step toward the protection of these forests from fire.

DAMAGE BY FIRES.

The immediate damage done by fire in the Southern Appalachians is much slighter than in the evergreen forests of the North and West. Crown fires are rare except in particularly dry seasons and under a high wind, and it is seldom that trees are consumed or even killed outright, except in second growth and young woods. The chief harm

[illegible] the killing of young tree growth and in the decay which starts from the scars left at the base of the trees, to which the Yellow Poplar, the White Oak, and the Hickories are particularly susceptible. The first thing for the timber cruiser here, after he has satisfied himself of the size and quality of the merchantable stand, is to look for traces of severe fires. Should they have run over the area, it is possible that the labor and loss in timber of butting off the decayed portion at the base of the tree may seriously impair the profit from the lumbering.

Apart from damage to the merchantable stand, the result of fire is here also greatly to disturb the balance between the different trees, a matter of some importance where there is so large a number in mixture, many of which are practically worthless. For example, the Dogwood, Sourwood, Black Jack, and Scrub Oak offer great resistance to fire, and are characteristic kinds in the young growth on burned-over lands. Repeated fires on White Oak and Poplar land will soon so dry out and impoverish the soil as to render it unfit for the reproduction of those species, to which a moist, rich soil is necessary. On the foothills and in the larger valleys where the Shortleaf Pine enters prominently into the mixture, oak forests are constantly being converted into pine forests through the agency of fire. A dense growth of Kalmia is frequently the result of repeated fires on south slopes and renders the growth of tree seedlings difficult or even impossible.

SUGGESTIONS FOR MANAGEMENT.

There are two principal problems presented to practical forestry in the Southern Appalachians. These are the management of the cut-over lands of the foothills and larger valleys, which have suffered from excessive grazing and repeated fires, and have been lumbered heavily, not only for timber, but also for fuel; the other, the management of the forests of the higher mountains, which still contain large bodies of virgin timber, and to which fire and grazing have done comparatively little damage. These are the two great classes of forest land in this region. They differ not only in past treatment and in the character, quality, and amount of the stand, but also in the demands which are made upon them. The forests of the foothills and lower valleys constitute the wood lots which must supply the farmer with his firewood and fencing. The mountain forests, on the other hand, are usually so difficult of access that they are as yet of value only for saw logs.

CUT-OVER LANDS.

It has already been mentioned that the cut-over lands characteristic of the more accessible and thickly populated districts consist largely of uneven-aged second growth, chiefly of Oak and Pine, with scattered old trees of the same kinds standing above it. The density is generally

low and the quality of the old trees exceedingly poor, while the second growth is often characterized by the presence of worthless species, by injuries due to fire and grazing, and by a lack of vigor which is the result of excessive shade. In some localities, where the young trees have been killed off by fire and there is left only a scanty remnant of the old stand, cuttings can do no good, and would be likely still further to impair the meager chances for successful reproduction. The larger part of these forests, however, is in urgent need of improvement cuttings, with the object of producing a denser and healthier growth, and of removing the trees of worthless kinds which have sprung up after lumbering or form a part of the old stand. The cutting out of undesirable species, such as Dogwood, Sourwood, and Scrub Oak, of branchy advance growth which is suppressing promising seedlings and saplings, and the gradual removal of the old trees, would be in line with this policy. These cuttings would entail no more than a thorough understanding of their purpose and a reasonable amount of care in their execution. They could be carried out successfully by the farmers after the principles had once been illustrated and explained by a forester. Their entire practicability has been forcibly illustrated upon the Biltmore estate, near Asheville, N. C., where about 4,000 acres of woodland, formerly owned by a number of small farmers, are made to produce annually about 3,000 cords of firewood, with a steady and marked improvement in the general condition of the forest.

It is often urged by the farmers that these careful cuttings would cost more than would be brought by the sale of their produce. The Biltmore experiment, in which a rule has been made that all cuttings shall at least be self-supporting, has satisfactorily established the fallacy of such a view. The firewood cut upon the Biltmore estate is sold in the open market in competition with that taken by the farmers from their own lands and under their own methods, and it realizes a fair margin of profit above the cost of cutting and hauling. It is to be remembered, however, that the good results of these improvement cuttings in the forests of the Biltmore estate would have been seriously impaired had not cattle and fire been kept out since the institution of systematic and conservative management.

VIRGIN FORESTS.

The mountain forests of the Southern Appalachians are silviculturally the most complex in the United States. They contain many kinds of trees varying widely in habit and also in merchantable value, and the forest type is constantly changing with differences in elevation, exposure, gradient, and soil. Their proper management is difficult, because the lack of uniformity in the forest renders it necessary constantly to vary the severity of the cuttings and to discriminate in the kinds of trees which are cut, instead of following only those general rules

which suffice where there are fewer species represented and the forest conforms more closely to a single type. In order to reproduce these forests successfully and to minimize the damage done by lumbering, first of all it will be necessary to have a radical improvement in the fellings. Such an improvement is entirely practicable, without additional cost per 1,000 feet B. M. of timber felled. It often requires no more labor to fell a tree up a slope than down it, or upon an open space rather than into a clump of young growth; and it is in just such cases as these that unreasoning disregard for the future of the forest is commonly manifested in the Southern Appalachians.

In the selection of trees to be felled, the small farmers, who for a long time were the only lumbermen in the Southern Appalachians, have been governed by the same considerations which govern lumbermen elsewhere. They have taken the best trees and left uncut those of doubtful value rather than run the risk of loss in felling them. Furthermore, the fact that they have lumbered generally on a very small scale and have often had great difficulties with which to contend in the transport of logs has led them to extremes in this respect. The result is that they have reduced the general quality of their forests in a measure entirely disproportionate to the amount of timber cut. As a rule, only prime trees have been taken, and those showing even slight unsoundness left uncut, except where the stand of first-class timber was insufficient. Diseased and deteriorating trees remain, to offset the growth of the forest by their decay and to reduce its productive capacity still further by suppressing the younger trees beneath them, while in the blanks made by the lumbering worthless species often contend with young growth of the valuable kinds. In other words, the lumbering has closely followed the selection system, but the principles governing the selection have usually been at variance with the needs of the forest.

In order to bring about successful reproduction of the desirable species and to maintain the quality and density of the stand, lumbering in the mountain forests of the Southern Appalachians must be governed by the following main considerations:

(1) Remove all diseased, overripe, or otherwise faulty trees of a merchantable size where there is already sufficient young growth upon the ground to protect the soil and to serve as a basis for a second crop of timber. In extreme cases, where the condition of the forest is greatly impaired by the presence of a large number of such trees, or where they overshadow and seriously retard promising young growth, their removal may be financially advisable when the sale of the produce no more than pays the cost of logging.

(2) So direct the cuttings that the reproduction of the timber trees may be encouraged in opposition to that of the less valuable kinds. This can not be successfully accomplished in the Southern Appalachians

by cutting to a diameter limit merely. A limit will by all means be advisable for each species, based upon a study of its rate of growth and the proportion which different diameters bear to its contents in board feet. It will be frequently necessary, however, to leave trees of a merchantable diameter where their removal would seriously impair density or where seed trees are necessary. In the leaving of seed trees many considerations are involved, only a few of which can be mentioned here. The Oaks, Hickories, Walnut, and Chestnut should be favored, since their seed is too heavy to be carried by wind, and much of it is eaten by animals. (Pl. XLIII.) The marked tendency of the Hemlock and Yellow Poplar to reproduce by groups must be encouraged. On south slopes and in dry localities generally, where Dogwood, Sourwood, and Scrub Oak contend with the timber trees, great care must be taken not to disturb the balance between them. The rich, moist soil of the poplar coves is particularly likely to produce a luxuriant growth of weeds and brambles instead of tree seedlings if too much light is admitted to the soil; while the Ash, Cherry, and Basswood, which are only sparsely represented in the mature stand and are further handicapped among the young growth by their strong demands upon light, would require an exceedingly conservative method of management.

NEED OF PRACTICAL FORESTRY.

The degree of care which is justified in the lumbering of any forest depends primarily upon the value of the timber which it produces. The higher the margin of profit on lumbering the larger the capital which is represented by the immature trees and the more important the financial considerations involved in their protection. Stumpage values are not sufficiently good in the Southern Appalachians to warrant the application of an elaborate system of forest management, but they are high enough to make a sound business measure of practical forestry. The production of repeated crops of merchantable timber is here advisable, not only on account of the price this timber commands at present, but because it is rapidly increasing in value for the lack of satisfactory substitutes, notably in the case of the Black Walnut, Cherry, Hickory, White Oak, and Yellow Poplar.

From the point of view of the State, further considerations are involved in the preservation of the forests of this region. They constitute the drainage basins of several important rivers, there is no other great forest region except the Adirondacks of northern New York which is within easy reach of so large a number of people, and its healthfulness is sufficient to have transformed it in the last twenty years from what was practically a wilderness to a deservedly popular health resort.

Yearbook U. S. Dept. of Agriculture 1900

THE CHESTNUT.

[Photograph by H. B. Ayres.]

LIBRARY OF CONGRESS
0 000 879 754 7